THE ZOOLOGIST.

THIRD SERIES.

Vol. V.] APRIL, 1881. [No. 52.

ON THE "HUMMING" OF THE SNIPE.

By the Editor.

[The articles on this subject, by Dr. Altum and others, which have appeared in recent numbers of the 'Ornithologisches Centralblatt,' seem to have re-opened the discussion of a question which is of much interest to naturalists. As the time of year is approaching when the "humming" of the Snipe may be heard by all who have opportunities of observing this bird in its breeding haunts, it will perhaps be agreeable to the readers of 'The Zoologist' to have a translation of the articles referred to, or at least of such portions of them as are material. This accordingly will be here attempted, and may be prefaced, not inappropriately, by an article on the subject which was contributed by the Editor of this Journal some years ago to the Natural History columns of 'The Field' (27th April, 1872), and which, it is believed, fairly states the case, and the points in dispute.]

Amongst the many rural sounds which greet the ear of the vagrant naturalist in spring, none is more remarkable than that produced by the Common Snipe in pairing time. This peculiar sound, which is never heard except from a bird on the wing, has been variously termed "humming," "drumming," "neighing," and "bleating," according to the fancy of the auditor, and nothing has puzzled naturalists more, perhaps, than to discover how this noise is produced.

Amongst German ornithologists especially this has been a favourite theme for discussion, and various have been the opinions expressed by eminent observers on the subject. Some, like Bechstein, have maintained that the sound is emitted through the bill; others, like Naumann, considered it to result from a vibratory movement of the wings; whilst the most remarkable theory (that of Herr Meves) is that it is produced by the outer tail-feather on each side as it is drawn rapidly through the air in the bird's descent. Let us see what foundation there is for these various opinions. As the noises made by birds usually proceed from the throat, it seemed but natural to suppose at first that the "humming" of the Snipe was similarly produced. But, as the bird has been observed close enough to see that sometimes the bill is closed when the sound is heard, while at other times the well-known cry of "chook-chook-chook" is uttered simultaneously with the "humming" sound, it becomes evident that the latter cannot be produced through the throat. In favour of the wings there is a good deal to be said, and here it will be desirable to refer to the peculiar position of the bird at the time the "humming" is produced.

On rising from the ground the Snipe mounts to a good height, and often flies to some distance before anything unusual is observed. A few rapid beats of the wing are then given, and, with half-closed pinions and spreading tail, the Snipe is seen to fall through the air in a sloping direction, as if about to re-alight. At a distance the wings then appear to be motionless, but on a nearer view a tremulous movement in them is observable. It is during this descent, and at no other time, that the peculiar "humming" sound is heard. Its continuance may be thus described:—For five seconds the bird gives rapid strokes with the wings; during the next five it falls through the air as described; in the succeeding five it rises again for a similar interval, only to fall at its expiration as before, and these movements are continued alternately until the bird at length re-alights in the fen. From the peculiar vibration of the wings in the downward descent of the bird, it would appear that the primaries, instead of firmly overlapping each other, are, in the act of "humming," turned broadside to the air, which is thus able to play across the inner web of each, and so impart to each a vibratory motion and consequent sound—faint, indeed, in the case of a single feather, but audible enough when an entire wing is acted upon. Whether this be the true explanation of the singular sound, it is of course not easy to prove conclusively; but it has certainly been accepted as such by many naturalists in

England, who are the more inclined to adopt this view from having observed that Peewits, Rooks, Gulls, and other birds, with tails very different from that of a Snipe, make an analogous sound when falling through the air. In the Peewit especially this sound is remarkably loud, and can be heard at a considerable distance by anyone who approaches in the nesting time the vicinity of its eggs or young. In the case of this bird, however, the sound seems to be produced more for the purpose of attracting the attention of the intruder and leading him from the nest.

The "theory of the wings," then, might possibly have met with general approval, had it not been for the ingenious discovery of the Swedish naturalist Meves, whose original observations were first made known to English readers through the instrumentality of a well-known English ornithologist, the late John Wolley. While on a visit to Herr Meves at Stockholm, Wolley learnt from him that an accidental misprint of the word representing "tail-feathers" instead of "wing-feathers" first led him to think on the subject. He subsequently examined the tail-feathers of different species of Snipe, blew upon them, and fixed them on levers that he might wave them with greater force through the air; and finally hit upon an ingenious contrivance which to his mind, and subsequently to the minds of many others, demonstrated that the "humming" is produced by the outer feathers of the tail.

This discovery was announced to English readers in an article which Wolley translated and communicated to the Zoological Society in April, 1858, and which was published in the Society's 'Proceedings' for that year. As this article, however, appears to have received comparatively little notice in this country, and certainly not that attention which it deserves from naturalists who, residing near the summer haunts of the Snipe, are best qualified to decide the question, I have thought it desirable, by a repetition of Herr Meves's theory, to give English observers an opportunity of testing its value at a time of year when the humming sound may be heard by anyone who will take the trouble to visit the nearest Snipe-ground. Herr Meves says:—

> "The peculiar form of the tail-feathers in some foreign species nearly allied to our Snipe encouraged the notion that the tail, if not alone, at all events in a considerable degree, conduced to the production of the sound. On a closer examination of the tail-feathers of our common species, I found

the first (outer) feather, especially, very peculiarly constructed; the shaft uncommonly stiff, sabre-shaped; the rays of the web strongly bound together, and very long, the longest reaching nearly three-fourths of the whole length of the web, these rays lying along the shaft like the strings of a musical instrument. If you blow from the outer side upon the broad web, it comes into vibration, and a sound is heard, which, though fainter, resembles very closely the well-known 'neighing.'

"But to convince one's self fully that it is the first feather which produces the peculiar sound, it is only necessary carefully to pluck out such a one, to fasten its shaft with fine thread to a piece of steel wire a tenth of an inch in diameter and a foot long, and to fix this at the end of a four-feet stick. If now you draw the feather, with its outer side forward, sharply through the air, at the same time making some short movements or shakings of the arm, so as to represent the shivering motion of the wings during flight, you produce the 'neighing' sound with the most astonishing exactness.

"If you wish to hear the humming of both feathers at once (as must be the case from the flying bird), this also can be managed by a simple contrivance. Take a small stick, and fasten at the side of the smaller end a piece of burnt steel wire, in the form of a fork; bind to each point a side tail-feather; bend the wire, so that the feathers receive the same direction which they do in the spreading of the tail as the bird falls through the air in flight; and then with this apparatus draw the feathers through the air as before.

"Such a sound, but in another tone, is produced when we experiment with the tail-feathers of other kinds of Snipe. But in *Scolopax major*, *capensis*, and *frenata* are found four humming feathers on each side, which are considerably shorter than in the species we have been speaking of. *Scolopax javensis* has eight on each side, which are extremely narrow and very stiff.

"Since in both sexes these feathers have the same form, it is clear that both can produce the 'humming' noise; and by means of experiment I have convinced myself that it is so. But, as the feathers of the hen are generally less than those of the cock bird, the noise also made by them is not so deep as in the other case."

This is the theory upon which I should be glad to hear some expression of opinion from English naturalists. I have tried the experiment for myself, and have succeeded beyond expectation in producing a sound like the "humming" of the Snipe; but I am still sceptical. In the first place, the outer tail-feather is not the only one which will emit a sound on being drawn through the air in the manner indicated, although I must admit that it is the only one which will make so loud and so good an imitation of the Snipe's "humming." But any of the primary wing-feathers will give forth a faint sound, which may be increased in proportion to the number of them passed through the air at once.

Again, it does not appear to me clear that the position of a tail-feather at the end of a long switch when drawn through the air is identical with the position which it would occupy in the tail of the bird when flying downwards. On the contrary, it would seem that the reason why the tail-feather emits a sound at the end of a switch is because it is drawn through the air, in a position which is occupied naturally by the primaries, but unnaturally by the tail, and hence that it must be the primaries (collectively) which produce the sound in nature. In this our sense of hearing is assisted by the sense of sight, for a perceptible vibration of the quill-feathers is observed every time the bird descends.

In the case of Peewits, Rooks, and other birds, it may be said that the sound which they produce in falling through the air is by no means identical with that produced by the Snipe. True; but it is an analogous sound, and the fact that they are able, with very different tail-feathers, to make a sound of this nature at all, seems in itself a strong argument against the tail-feather being the agent in producing it.

In offering these remarks for the consideration of naturalists, it must not be supposed that I wish to disparage in any way the extremely ingenious theory of Herr Meves, which has met with the approval of many ornithologists: at the same time it may be observed that this theory is by no means universally accepted, and in expressing my own adherence to the "theory of the wings" I am supported by the opinion of many excellent field-naturalists.

The late Sir William Jardine wrote:*—"The sound is never heard except in the downward flight, and when the wings are in rapid and quivering motion; *their resistance to the air, without doubt, causes the noise* which forms one of those agreeable variations in a country walk, so earnestly watched for by the practical ornithologist."

Mr. John Hancock, in his 'Catalogue of the Birds of Northumberland and Durham' (1874), devotes several pages (pp. 106—113) to a consideration of this question, and gives his entire adherence to the "theory of the wings." His remarks, too long to be quoted here, are most interesting, and ought to be read *in extenso* by all who have not already formed an opinion on the subject.

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* 'The Naturalists' Library' (Ornithology), vol. xxvi., p. 180.

The late Dr. Saxby, once a frequent contributor to the pages of this Journal, has discussed the matter in his 'Birds of Shetland,' and at page 204 of that work observes:—"The many years' intimate acquaintance with the bird and its habits which I have enjoyed confirms me in the now generally received opinion that *the 'drumming' is produced by the vibration of the wings alone.*"

The most recently published testimony on the subject, with the exception of the German articles already referred to, is that of Capt. W. V. Legge, who, in the Appendix to his admirable work on the Birds of Ceylon, has expressed a very decided opinion on the subject, based on his own personal observation. As this will probably be new to many readers of 'The Zoologist,' it may be here appropriately quoted. Capt. Legge says:—

> "The most favourable occasion I had for observation was on the evening of the 10th June [in Wales], when a Snipe having young near where I was standing, 'drummed' over my head, flying backwards and forwards in the manner now to be described, without cessation, for a period of fifty-two minutes, timed by my watch. * * * * * * * The aërial course taken by the bird was an ellipse, of the average length of a quarter of a mile, described over where I stood; but it was sometimes varied by her making a figure of 'S' above my head, the bird always returning to its original starting-point in the air, and again making the same tour. The movement for the purpose of 'drumming' was generally performed twice, but sometimes thrice, going and coming, making from four to six times in each figure described. It flew at a height of about 100 yards with a quick and regular movement of the wings, and 'drummed' in this wise:—The body was suddenly turned on one side and the bird descended rapidly for about 100 feet at an angle of 45 degrees, moving its wings with very rapid and powerful strokes, its tail being at the same time opened to the utmost; having arrived at the lowest point of its descent, it suddenly turned its body in the reverse direction, that is, elevated the wing which had been before depressed, and with a short upward sweep ceased the drumming noise and rose to its original position, continued its course for a short distance, and then descended with the same rush again. The movement was always performed with the same wing pointed downwards throughout one half of the bird's course; that is, if it commenced to drum with the left wing down when flying from east to west, that wing was

inclined downwards the next time it descended, until the course was altered, and the bird flew back from west to east, when usually the other wing was inclined towards. The instant the bird commenced its descent, the 'drumming' noise was heard, and it continued till it finished off with a sort of whiz directly the upward sweep, by which the bird recovered itself, was performed.

"By closely watching the bird it could be distinctly *seen* that the vibrations falling on the ear *coincided exactly with the beat of the wings*, which, assisted by the downward rush through the air, were the *primary* cause of the sound. The tail, however, was spread as I have already remarked, and to such an extent that it took the form of a fan, the lateral feathers being at right angles to the centre; and herein lies the *secondary* cause of the sound. During the drumming beat of the wing, the quills are more drawn back than in the ordinary strokes (this can be observed if the bird be closely watched), so that the atmospheric wave or air propelled by the powerful stroke of the wing is drawn through the rigid, sabre-shaped and opened-out feathers of the tail, thus making the peculiar noise."

Thus, in the opinion of Capt. Legge, the sound is produced *by the combined action of wings and tail:* he suggests a compromise, in fact, between the adherents of the "wing-theory" and "the tail theory," reminding one of the old story of the disputants about the gold and silver shield!

In the 'Ornithologisches Centralblatt' (1st Oct., 1880), Prof. Altum has an article on this subject, in which he relates a curious story, for the truth of which he vouches, and which he adduces in support of his own view that the tail-feathers alone are instrumental in producing the sound in question. We need not translate the article *verbatim*, but, for the sake of brevity, will give the substance of his remarks. He says:—

"With regard to my theory of the 'bleating' (*meckern*) of the Snipe,* published in 1855, namely, that the expanded tail-feathers cause the sound, and which theory was afterwards immaterially modified by my attributing the sound to the outer tail-feathers only (for with these, at least, the sound can be imitated), I refer to the 'Naumannia' for 1855 (pp. 362, 499).

"By means of the experiment with a tail-feather on a wire, I had no difficulty in bringing foresters hitherto sceptical or altogether averse to the theory (I could adduce a goodly list of well-known names) to an unqualified

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* "Bleating" appears to me to be a very inappropriate term, for it implies a vocal effort on the part of the bird, which Dr. Altum does not suggest.

concedo. In spite, however, of my own conviction, confirmed by experiment, two adverse cases reported by a forester caused me still to reflect upon it. In both cases a Snipe was said to have been observed 'bleating' as it sat, or rather stood, on a little elevation of the ground. From my point of view this seemed to me impossible, and I therefore attributed the forester's statement to a delusion on his part, caused by his having supposed that the sound from an unseen Snipe high in air proceeded from the bird which he saw sitting close at hand. I have since received from our Academician, Herr Alexander Schmidt, the following highly interesting piece of evidence:—In March, 1880, in his teaching district, Neuhäusel, he shot a Snipe which he only winged. He carried it alive in his hand and against the wind. Suddenly it began to 'bleat' softly, the tail being stiffly expanded and the air blowing on the web of the feathers producing such a sound as would be caused by blowing on a knife-edge. To convince himself on the subject, Herr Schmidt moved the bird rapidly against the wind, and found his object fully attained. For a good half-hour he had the satisfaction of letting the expanded tail-feathers 'hum' as he pleased in the way indicated. The sound differed in no respect from that produced by a pairing Snipe at large. With the knowledge of this fact, the last doubt as to the origin of this much-talked-of sound should be set at rest.

"This seems to prove, first, that the tail-feathers, without the aid of the wings, produce the sound, for the wings of the bird in question were laid close to the body and restrained by the hand; and, secondly, that the sound may be produced from a Snipe sitting on the ground when subjected to only a moderate opposing wind as described. In conversation with several of our Academicians on this circumstance, two of them, Herr Schilling and Herr Goebel, informed me that they had heard a Snipe 'bleat' upon the ground, and the former distinctly remembered that a strong breeze was blowing at the time."

In a subsequent number of the 'Ornithologisches Centralblatt' (15th Nov., 1880), Herr Zöppritz, of Darmstadt, confesses his inability to accept this story, and, admitting that the forester referred to heard the sound in question while he held a wounded Snipe in his hand, suggests that he was under a misapprehension as to the way in which it was produced. He says:—

"As is already known, much has been written on this subject, especially in Cabanis' 'Journal für Ornithologie' and in the 'Naumannia,' without any definite settlement of the question being arrived at. Two years ago, in Waidmann's 'Sporting Journal,' I published an article on this subject, wherein I offered to pay a fine of 500 marks to the treasury of the 'Allgemeine Deutsche Jagd-schutz-verein,' if three umpires appointed by the 'Verein' publicly declared (with their names subscribed) that they were convinced that Snipes produced their bleating notes, not through their vocal organs, but by means of their wings, with or without the help of their tail-feathers.

"Now, however, Prof. Altum, in Dankelmann's 'Blätter für Forst und Jagd-wesen' (Orn. Centralbl., 1st Oct., 1880, p. 149), has brought forward a new observation thereon, which is so extraordinary, that it cannot possibly be passed over in silence. He asserts that the sound is caused by the tremulous movement of the outer tail-feathers of the bird when precipitating itself with great rapidity. Naumann, on the other hand, says that one may convince oneself by sight (all the better with a telescope) that Snipes 'bleat' by means of a rapid vibration of their wings. These wholly opposite views, of which one is to be convinced by sight, prove nothing more than the absolute fallacy of this means of proof. Both naturalists are agreed that, by means of a tail-feather fastened to a stick or wire, and moved hither and thither through the air, the sound can be pretty well imitated. In theory this is right, but the actual experiment proves that the sound thus produced is not audible at more than seventy yards distance, while the 'bleating' of the Snipe can be heard through the calm air ten times as far. This means of proof is quite as valueless as that of sight.

"A distinct contradiction to these assertions is furnished by Bechstein, who stated, seventy years ago, that he had often heard Snipes 'drum' as they sat on dead boughs of trees. This was corroborated by 'Dietrich aus dem Winckell,' in his 'Handbuch für Jäger,' through a friend, on whose authority he could rely, and who had twice heard Snipes 'drum' from dead boughs. W. Hintz reported in 'Naumannia' (1854, p. 90), amongst other observations, that during his apprenticeship he had at least ten times seen and heard Snipes 'drum' from dead oak-boughs in a marsh, and what he had seen and heard he strongly asserted. Subsequently, 'Graf E. E.', in 'Waidmann' (vol. ix., part 17), reported that an observant sportsman had heard a Snipe 'drum' while sitting on a telegraph-wire.*

"The observation above referred to, as reported by Prof. Altum, is to the effect that a winged Snipe, held in the hand, 'bleated,' not with its bill, but with its widely extended tail-feathers! To convince himself of the sound, the experimenter moved to and fro with the bird, and found his object achieved, making the tail-feathers hum loudly, just like the sound of a bleating Snipe. This assertion seems so extraordinary, that it must be regarded as a delusion, for one can only arrive at the reasonable conclusion that so long as Herr Schmidt's Snipe was held in the hand it 'bleated' from pain or fright, not that the 'bleating' was caused by the expanded tail-feathers moving to and fro in the air—an idea which it is absolutely impossible to accept. More than twenty-five years ago people assumed the 'tail-theory' to be proved by moving a stick with a tail-feather attached violently to and fro. To-day they may obtain the same proof by holding a Snipe's tail in the hand and moving it repeatedly to and fro! Comprehend this who may!

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* We have heard a similar sound from telegraph-wires when there was no Snipe sitting there!

"If we make the experiment with a tail thus expanded, we shall find that no sound is audible. In short, taking everything into consideration, of all the grounds advanced in support of the wing and tail theories, none in my opinion stand proof. Anyone with any knowledge of mechanics, or physics, if he sufficiently examines a dead Snipe, must be convinced that so small a bird, with wing- and tail-feathers so comparatively weak, cannot possibly produce sounds with them which are at such a distance so sharply accentuated. Hence I indulge the hope that the adherents of the wing and tail theories will now withdraw their opinions and acknowledge that 'to err is human.'"

To this article Dr. Altum, in the 'Ornithologisches Centralblatt' (15th Jan., 1881), has replied, briefly, as follows:—

"After recording the new facts imparted to me by Herr A. Schmidt, I should have felt no occasion for writing further on this subject, but should have contented myself with the assurance that I have many supporters in my theory, had it not been that Herr Schmidt has been placed in a somewhat disparaging light by Herr Zöppritz. I was pleased to see, in 'Ornithologisches Centralblatt' (1880, No. 22), that his expressions were more modified, and that Dr. Reichenow (the editor) in his notes had broken the point of many of Herr Zöppritz's objections. Nevertheless, I feel myself called upon to defend Herr Schmidt's reputation for veracity, which has been called in question through my publication: and it can do no harm to have the facts placed before us in a clearer and more detailed manner than was formerly done.

"Referring to the contents of the article just mentioned, Herr Zöppritz gives the following reasons for disputing the 'tail-theory,' or, shall I say, in proof of the 'throat-theory':—(1) The bleating sound produced by the feather and wire does resemble the Snipe's 'drumming,' but it is too weak; (2) There is no analogy to be found in the bird-world; (3) Herr Schmidt has been mystifying us; (4) Anyone with the slightest knowlege of mechanics or physics would be convinced, on examination of a dead Snipe, that my opponent's theory is untenable.

"These are the reasons which are to induce every opponent to 'withdraw, and acknowledge the truth of the saying "to err is human."' If Herr Zöppritz could give me his word that he had held a living Snipe in his hand, or kept one in captivity, and had seen and heard its 'throat-bleating' in his own immediate presence, I would lower my colours, and say no more of 'mystification,' &c. When a fact has been unequivocally attested by a man of honour, discussion is at an end. Such a man is our Forstcleve, Alexander Schmidt; and he gives his word of honour for the absolute truth of the following account:—

" 'In the week preceding Easter, 1880, I had been shooting Snipe on an extensive marsh, much frequented by these birds, which lies near my home (a little north of Baumbach, a village in the Unterwesterwaldkreis, Hesse-Nassau). One of the Snipe was but slightly winged. Intending to place it in a meadow at home, and use it to train my young dog, I picked it up with my right hand, carefully folded the wounded wing, and started on my twenty minutes' walk towards home. A cold sharp east wind was blowing in my face. Suddenly I became aware of a hollow vibratory sound. I looked around in astonishment, and discovered at last that this sound proceeded from the Snipe in my hand. The bird repeated this noise many times, while at the same time it spread out the little uninjured tail-feathers in the form of a wheel. When I had observed the way in which each separate feather was set in vibration by the wind, it became easy to strengthen the sound by moving the bird more quickly against the wind, whilst it held its tail stiffly spread out. There was absolutely no difference between this sound and the well-known 'drumming' of the Snipe, as I had heard it thousands of times in that neighbourhood, and especially on quiet evenings, when it was audible at a great distance. I made the same experiment several times in presence of my father, who is a forester, and other relatives, and then used the bird as I had originally intended. I have related this fact to many experienced sportsmen and foresters in that neighbourhood. They were interested in the occurrence; but it was by no means new to them, for they had always regarded the tail-feathers as the vehicles of sound, although they had not sought for any particular verification of this belief.'

"Such are the facts which have lately excited so much difference of opinion in sporting journals."

ORNITHOLOGICAL NOTES FROM MAYO AND SLIGO.

By Robert Warren.

The fine dry warm weather of the summer of 1880 proved most favourable to small birds, and especially so to the summer migrants, which in this district appeared in larger numbers than usual; and the numerous young birds seen later in the season about the hedges and plantations, contrasting with the few seen during the previous summer, also proved how favourable was the season of 1880 for their increase. Some of the summer birds appeared to have instinctive knowledge of the prospect of a fine summer, or at least we may infer so from the fact of the very early arrival of the Chiffchaff and others.

On the 20th March a Chiffchaff appeared here in full song, and was heard almost daily throughout the season. Sandwich Terns were seen on the river and estuary on the 24th, nearly a fortnight earlier than in 1879. Willow Wrens on the 19th April, ten days earlier than the previous season. Swallows and Martins were also seen on the 19th, somewhat later than in 1879; Whimbrels on the 1st May; Corn Crakes on the 2nd; Cuckoos and Swifts on the 12th and 13th; Common Terns on the 14th; a Sedge Warbler on the 15th; and our latest visitors, the Whitethroats and Spotted Flycatchers, on the 19th May.

With regard to the losses caused by the arctic winter of 1878-79 amongst various species, some birds had regained their usual numbers; for instance, the Blackbirds and Robins; while the Missel Thrushes and Song Thrushes have not nearly come up to the average, being still very scarce in this locality. Common Wrens and Tits are also very scarce.

On June 29th I went round the estuary in my punt to see if any of the winter birds had lingered on about the sands instead of leaving for their northern breeding-haunts. I only met with a few Godwits; one having a white head and neck puzzled me at first, before I made out what it was. On July 10th I saw some Greenshanks and Redshanks at Roserk, just come back from their breeding haunts. On the 22nd I heard a Whimbrel, and saw Lapwings assembling in flocks after the breeding season.

The number of Starlings which visited us last autumn was very small indeed, not a twentieth of the number which usually frequented the district previous to the winter of 1878-79; but whether their scarcity can be attributed to the losses of that severe winter or to the foreign-bred birds shifting their line of migration to some other quarter, it is hard to say, though perhaps both causes combined may account for the scarcity. Want of food cannot be the cause, for the wide extent of pasture-land where they fed in both counties (Mayo and Sligo) is quite as extensive, if not more so, than ever.

Of our winter visitors the first to put in an appearance was the Widgeon, a few being seen on September 2nd, but these probably had been bred in some of the remote mountain loughs, for the main flock did not arrive in the Estuary until about the middle of November. On September 28th I saw near Bartragh either a young male or female Scaup Duck. A few Redwings appeared about our trees here on October 9th; they were very restless, flying about from one wood to another, as if not knowing where to settle down; but in the course of a week they settled on our hawthorn hedges, and were joined by others later on, so that by the end of the month they appeared to have arrived in their usual numbers, as if they had quite recruited the losses of 1878. Fieldfares were very scarce; they appear, like the Thrushes, to be increasing very slowly.

The weather became very cold and squally by the 20th October, the low temperature continuing throughout the week, the mercury in thermometer falling to 28° on the night of the 27th, and on the following day, when in my punt near Roserk, I was surprised at seeing a Wheatear hopping about the stones on the shore; it looked quite healthy and lively, not showing any appearance of suffering from the cold.

On the 2nd November I saw a little party of Golden-crested Wrens in one of our hedges, the first seen here since 1878, the cold of that winter having apparently cleared them out of this district altogether. These birds were probably migrants, it not being likely they had bred in the neighbourhood.

We had quite an invasion of Bullfinches last autumn and winter; they were to be seen in almost every hedge throughout the district, both on the Mayo and Sligo side of the Moy, and although not more than three or four birds could be seen together at any time, yet they were generally distributed. This migration of such numbers was the more remarkable from the fact that I have seldom seen more than three or four birds in a season in this neighbourhood.

The flocks of waders which visited us last winter were much smaller than usual; even the Curlews were much under the average, and neither Redshanks nor Greenshanks were numerous. Golden Plover were very scarce, and I never remember so few Lapwings being about the sands, the early frosts having driven them out of this locality. There was a fair promise of them at the end of the summer, when the flocks began to assemble after the breeding season, but they soon shifted their quarters elsewhere.

As if in intimation of the severe weather of January, we had—what is most unusual in this locality—some very sharp frosts in the middle of November, the mercury falling to 27°, 25°, and 24° on the nights of the 16th, 17th and 18th. However, the weather became mild for the rest of the month and the early part of December; again, in the last week of that month, a smart frost set in for a few nights; but this went off, and on the 7th January a frost so hard set in as to stop all farm work, such as ploughing or digging, and on the 11th some snow fell, followed by more on the 12th, covering the ground nearly to a depth of seven or eight inches, accompanied by such intense frost that night that the mercury fell to 11°, and as the bogs and loughs became frozen over, great numbers of Wild Ducks were driven down to the sands next day. The small birds then began to look poorly, for the snow that fell was so fine and dry that it penetrated into and under every bush and hedge, leaving no place uncovered where they could feed, consequently all had to take to the shore to search for food amongst the stones and sea-weed. On the 14th I saw about the shore and sands, Rooks, Magpies, Blackbirds, Thrushes, Fieldfares, Redwings, Larks, Titlarks, Starlings, Hedge-sparrows, Robins, Stonechats, Chaffinches, and a few Yellowhammers, and found a Redwing starved to death.

We began feeding the small birds on the lawn close to the door, but found it almost impossible to prevent the Rooks eating up everything, although they were fed with the fowls in the stable-yard. With the addition of Missel Thrushes and Black-headed Gulls, and some Tits, all the above-mentioned birds came to be fed, but notwithstanding a regular supply of food was frequently put out during the day, yet the numbers of each kind coming to be fed diminished daily, so that when the thaw set in on the 26th our poor pensioners had dwindled away to eight or ten Blackbirds, two or three Thrushes, and an odd Starling or two, but of course the Rooks were in full force and numbers, though some had become very weak. The Yellowhammers and Finches mostly kept near the barn-door, where they had an abundance of refuse corn and seeds, and therefore were better off than the other birds. We had more snow on the night of the 15th, and the cold was so severe that the thermometer registered 25° of frost, which covered the tidal part of the Moy from Castleconnor Point to above the Shipping Quay with a thick coat of ice, completely closing the navigation of the river, which did not re-open until the 28th, when the rising spring-tide burst the icy barrier.

On December 17th there was another fall of snow, increasing in depth on the level parts of the country to twelve or fifteen inches, but much deeper where it drifted into the hollows; this fall closed up everything, and as it froze on the trees and bushes when falling, it made the poor birds far more wretched. All the Woodcocks left this part of the country, and very few Snipe remained, and these were afterwards nearly all shot or trapped at the few unfrozen springs where they came to feed. The fog was so thick I was unable to go down the river, but while waiting in my punt, hoping the fog would rise, I got a pair of Tufted Ducks and a Scaup with my shoulder gun; they were all immature males. The frost and snow still continuing, nine Wild Swans visited us, and rested for some hours on the water just opposite where I keep my punt, but an easterly wind blowing hard prevented my launching her and following them, so they got off unmolested for the time. On the night of the 20th the frost was so intense that on the following morning all the bays and inlets were closed in by ice, which covered all the flats of the river and estuary, and as the *Zostera*-covered bay where the Widgeon generally feed was also covered by ice, and owing to the low neap tides was not floated off, the poor birds were half-starved. Large numbers of Wild Ducks lay on the ice all day, and although I made several attempts to get at them, I was unable to force the punt through the ice within shot, though once, after working through for over two hundred yards, I stuck fast when almost within shot, and had to back out again, much disappointed at my bad luck, for over a hundred Ducks were lying on the ice as closely packed together as they could lie. Curlews and Black-headed Gulls now began to die off, and some Ducks and Wild Geese that I shot were almost useless, they were so thin; but most of those killed up to this date were in fair condition. Small birds were dying off, and some of the Rooks looked very weakly, though they returned to their carnivorous habits and were killing and eating weaker birds. I saw one killing a poor Black-headed Gull, and observed two others tearing at a dead bird of their own species.

On the night of December 21st the cold was again very intense, the thermometer registering 24° of frost, and the poor birds at once began to show the effects of this, those which came to be fed having their feathers ruffled, and many of them when feeding sitting on the ground with their legs drawn up into their feathers, fearing the pain of the frozen ground. A flock of eighteen Wild Swans crossed over the river; they did not rest, but passed on direct for Killala. I found a Curlew unable to fly, but although I crammed him with some raw meat, he was too far gone, and died the following day. The Black headed Gulls were so starved, that numbers fed with the small birds on the window-stools of the houses in the streets of Ballina; and Mr. W. Little, of Ireland Cottage, near Ballina, who fed the Gulls regularly during the frost, had a flock of about fifty Gulls so tame that whenever he appeared outside his door they all flew close round him like a flock of tame Pigeons. He fed them on bread, cutting up two or three large loaves every day.

On December 23rd the frost was not so severe, the mercury rising to 40° at 9 a.m., and standing so all day. This rise of temperature caused a remarkable change in the appearance of many of the birds we were feeding; they became quite smart and lively, with their plumage smoothed down and close. But towards dusk all this was changed, the frost setting in again, and with such intensity that before morning the thermometer registered 19° of frost, and the poor birds looked worse than ever.

On December 24th, when going down the river, I met with an adult male Shoveller, in most brilliant plumage, and although I was anxious to secure him, I did not fire, fearing to injure him too much by the heavy charge of my punt-gun. That night was exceedingly cold, the thermometer indicating 21° of frost, so that on the morning of the 25th there was more ice than ever about the shores of the river and estuary; and as all the feeding-grounds of the Widgeon were covered, some flocks were so starved that wherever they found any small feeding-place thawed by the tide they would return to it in a few minutes after being fired at, the noise of the gun only scaring them to a short distance.

However, better times were near at hand for all birds, for on the night of December 26th a light thaw with snow set in, and became so confirmed and rapid the following day, that some grass began to appear on the highest parts of the fields, which on the 28th were sufficiently free from snow for the cattle and sheep to feed. This was a great relief to them after living for sixteen days deprived of all green food.

This long period of twenty days of hard frost and sixteen days of deep snow, coming so soon after the hard winters of 1878-79 and 1879-80, must have had a most disastrous effect on our small birds, and more especially on those species whose numbers had not recovered the previous losses; while the berry-eating birds, such as Missel Thrushes, Fieldfares, Redwings, &c., must have suffered considerably, for a poor supply of haws was all cleared off by the middle of November.

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

By John T. Carrington, F.L.S., and Edward Lovett.

(Continued from p. 101.)

II. Structure.

Continuing our remarks, we now propose to give, for the benefit of intending students, a short outline of the general features which characterise the structure of this class of animals, more particularly with a view to affording some explanation as to the technical terms, which we may find it necessary to use, in describing or referring to the various species under consideration. We have already referred to Professor Huxley's able work, 'The Crayfish,' which we have adopted as a guide in following the broad lines of structure, and to which we would again refer the student in his study of form and development of Crustacea.

The chief feature of this class is that they possess an external skeleton, which is known as the exoskeleton. This, being composed principally of carbonate of lime with a comparatively small proportion of phosphate of lime, is naturally rigid, and not expansive or contractile; hence the necessity for a frequent casting of the shell which is such a prominent feature in the economy of these animals. It is well known that when the growth of the animal has so far advanced that a fresh shell or case is necessary for its comfort and further development, there takes place what is termed "exuviation" or "ecdysis"; that is, the old shell is entirely cast off, even to the covering of the eyes and the chitinous membrane of the stomach. After this operation, as might be expected from their unprotected condition and defenceless state, the animals are of a retiring disposition, until the expanded body has formed a new secretion of lime; in other words, a new exoskeleton. This exuviation takes place frequently during the early life of the animal, but not so often in adults. There is, we think, some difficulty even yet as regards our knowledge of this period of exuviation, for we have just preserved a specimen of *Lithodes maia*, which, if size be any proof of age, was only half-grown. This specimen was just on the point of casting its shell, which was, however, covered with fine living *Balani*, or barnacles, more than two inches in height.

We may here mention, as regards the mature female of many species, that it is just after exuviation, and when the new shell is still soft, that pairing usually takes place.

Another remarkable feature of the life-history of the Crustacea is their power of reproducing lost limbs; under these circumstances the ease with which they part with limbs under the influence of terror will be understood. This dislocation takes place at the narrowest joint of the imprisoned or injured limb, and the bleeding which ensues coagulates over the wound. The new limb is first produced in the form of a small tubercle, which enlarges at each successive casting of the exoskeleton, but which probably rarely attains to the size of its corresponding member. Species of the genera *Xantho* and *Galathea* are especially subject to this voluntary dismemberment.

Reverting now to the subject of structure: the exoskeleton is divided roughly into three parts or regions—namely, the CEPHALON or head, the THORAX, and the ABDOMEN. In the *Brachyura*, or Crabs, the head and thorax are united in one roughly oval or circular case, whilst the abdomen is but slight and bent under the thorax, fitting into an aperture between the leg-joints. In the *Anomoura*, among which may be instanced the Hermit Crabs, many of the forms have the thorax and head more elongated, and the abdomen soft and devoid of segments, protected by insertion in the dead valves of Mollusca. The *Macroura* (or Lobster forms) have the thorax and head generally cylindrical, and the abdomen developed into arched segments. These segments are decisively separated, but the division of the head and thorax is only marked externally by a cervical groove, although the interior structure clearly indicates where this boundary really occurs. The segments already referred to are termed SOMITES, the lower wall of which is the STERNUM, to which in the abdominal region the swimmerets are attached. These last appendages each consists of a stalk or stem, which is composed of a very short basal joint, the COXOPODITE; next to which is a long cylindrical second joint, the BASIPODITE; the whole stem being called the PROTOPODITE. The swimmerets differ widely in different species, many of the *Brachyura* having them of a decided plumose structure—no doubt a necessary apparatus for the protection of ova, which, when discharged, are attached in a group by a viscid stalk to the coxopodite, each mass of ova being shielded by the above-mentioned swimmerets. This formation of the ova in distinct groups is not general, but may be well observed in *Hyas coarctatus.* In others, however, they are attached severally and by separate ligatures; whilst in others, again, they appear in the form of long strings radiating from a common centre, as in the case of *Carcinus mænas* and *Corystes cassivelaunus.*

The tail appendages, differing slightly as they do in different genera of *Macroura*, may be broadly described as consisting of a fan-shaped arrangement of plates, the centre one being called the *telson,* which consists of two segments. The appendages on either side of this are more or less fringed with a hair-like substance, and the whole apparatus, together with the abdominal somites, are capable of very powerful muscular contraction, so that the rapid backward motion in the water, of many species, is thus attributable to this remarkable development. *Scyllarus arctus* and the members of the genus *Galathea* are particularly characterised by this power. So sure is their course through the water, and so complete their control over the muscular energy of this fan-shaped repeller, that *Galathea strigosa* has been observed to dart backwards a distance of several feet, with most remarkable activity, straight into a small cleft in a rock, though the hole was barely large enough to admit its body.

The Suborder under our consideration is termed Decapoda, from the fact to which we will now refer, namely, the existence of ten feet, or legs, otherwise termed AMBULATORY APPENDAGES. These ten legs also vary in the different tribes, and must therefore be considered accordingly; but taking the second ambulatory leg of *Astacus fluviatilis,* as given in Prof. Huxley's work on 'The

Crayfish,' its segments consist, firstly, of a basal joint, the COXOPODITE, followed by the BASIPODITE, ISCHIOPODITE, MEROPODITE, CARPOPODITE, PROPODITE, and DACTYLOPODITE in succession. This limb may be taken as sufficiently characteristic to refer to when necessity requires such reference.

In the *Macroura* the first pair of legs are generally developed into broad hands and forceps, the development of which is strikingly varied in the different genera and tribes; for in the *Palæmonidæ*, for example, they are but slightly enlarged, the second pair being the larger. Again, in *Nephrops norvegicus* they are long, fluted, and tuberculated; whilst in *Homarus marinus* (= *vulgaris*) they are broad and massive. Perpetual discrepancies also exist in some, as in the case of *Axius stirhynchus* and *Callianassa subterranea*, where one hand is very primitive, whilst its fellow is well developed. In the *Anomoura*, again, this variety also exists, the *Paguridæ* being characterised by one being large and the other small; whilst in the *Galathea* they are symmetrical, though again differing in point of detail, some being spinous and others scaly. In the *Porcellana* they are broad and flattened, being, in the case of *P. platycheles*, fringed with hair on the outer margin. In the *Brachyura* they are symmetrical, but vary from being attenuated and smooth, as in *Gonoplax angulatus*, and the same, only spinous, as in *Eurynome aspera*, to being vertically broad and hairy, as in *Atelecyclus septemdentatus*, and massive as in the case of *Cancer pagurus*. In the *Anomoura* the last pair of feet are either rudimentary or, if developed, of little practical value for walking; whilst the corresponding pair in the family *Portunidæ* have the last joint paddle-shaped: hence this family are known as Swimming Crabs. Many species have the terminal hook extremely sharp. This is particularly observable in the genus *Pisa*, where this sharp hook has the power of clenching its hold on such substances as branches of *Algæ*, &c., much in the same way as do many parasites, especially *Acari*.

Referring now briefly to the appendages situated in the front of the thorax, we find in the *Podophthalma* a pair of eyes fixed to stalks more less developed, and again exhibiting a remarkable variety of form, one species in particular, *Gonoplax angulatus*, having this stalk of considerable length.

The antennæ, like the eyes, consist of one pair, also varying greatly, and below these we find a pair of antennules; these organs are divided above by a rostrum, which, from being prominent and serrated as in the *Palæmonidæ*, become a simple rounded continuation of the carapace, as in *Portunus arcuatus*. The development of new antennæ differs somewhat from that of the other limbs, for it is found in a spiral coil enveloped in a case, which, being thrown off at the period of moulting, the new organ uncoils and hardens into its normal position.

The mouth organs will be more fully considered when we come to the question of food.

The following is a short glossary of terms which we shall hereafter use, from time to time, in describing the external organs or parts of the *Podophthalma*. If any others should arise we shall explain them on the first occasion of their use.

Abdomen.—In the *Macroura* that part which commences at the end of the cephalothorax, commonly called tail; in the *Brachyura* and some of the *Anomoura*, that which folds under the cephalothorax (q. v.).

Ambulatory appendages.—The legs used for walking.

Antennæ, external.—The outer and longer feelers.

Antennæ, internal, or antennules.—The inner and lesser feelers.

Antennal scale.—The flat process attached to the base of the antennæ in the *Macroura*.

Auditory orifice.—A small orifice on the epistome (q. v.) near the base of the antennæ.

Basal joint, or coxopodite.—The joint next the carapace.

Branchiæ.—The gills, or breathing organs.

Branchial chamber.—The cavity in which the branchiæ are placed.

Carapace.—The upper covering of the cephalothorax (q. v.).

Cephalothorax.—The carapace and thorax, or that part before the abdomen.

Coxopodite.—See Basal joint.

Epistome.—The plate on the cephalothorax between the basal joint of the antennæ and the mouth organs.

Exoskeleton.—The whole of the external shell or covering.

Eye-stalk.—The process which bears the visual organ.

Fingers, or forceps.—See Hands.

Hands.—The terminal joint of the anterior legs, carrying the fingers, of which one only is movable.

Mandibles.—The organs of mastication.

Maxillipedes.—The foot-jaws.

Orbits.—The cavities wherein the eye-stalks are contained.

Ova.—The eggs, or spawn.

Palpus.—The spine attached to the base of the external antennæ.

Peduncle.—The stalk, or that part of the antennæ up to the third joint.

PEDIPALPS.—See MAXILLIPEDES.

PLEURÆ.—The peaked, lower lateral edges of the somites in the *Macroura*.

ROSTRUM.—The spine, prominence, or sword-like projection of the anterior portion of the carapace.

SETÆ.—The hair-like processes of the exoskeleton.

SOMITES.—The divisions, or segments of the head, body and tail.

STERNUM.—The chest, or under portion of the cephalothorax.

SWIMMERETS.—The abdominal appendages, used for swimming in the *Macroura*, and generally for the protection (in the females) of ova and zoeæ.

TAIL.—The anal portion of the abdomen.

TELSON.—The middle terminal plate or plates of the tail in the *Macroura*, and some of the *Anomoura*, which enclose the anal orifice.

TERGUM.—The upper or back part of the somite.

WRIST.—The joint next the hand.

ZOEÆ.—The larval form of Crustacea.

Although we have only alluded in a superficial manner to the characteristic points in the structure of the Stalk-eyed Crustacea, yet we venture to think it will be sufficient to enable the student to identify parts or limbs when peculiarities of form connected therewith call for description or reference in future observations on genera or species. It is not necessary for this purpose to touch upon the internal structure, on which, indeed, an entire volume might be written, and which would be of no utility in a paper treating of methods of identification by means of skeleton-structure and external form.

The first lesson in the study of this class of animals should be to procure a perfect specimen of, say, the common Lobster, *Homarus marinus*, or of the river Crayfish, *Astacus fluviatilis;* then, taking Professor Huxley's book, 'The Crayfish,' as a guide, dissect and clean the exoskeleton, attaching, to a board neatly covered with black or French-grey paper, each part, limb, appendage, or segment, placed a short distance apart, but in their relative positions; then, with a fine brush and a little pigment, place a small number close to each part; each number should correspond to one, either on a reference table at the foot of the board, or in a note-book. This table or note-book should contain full descriptions of the various articulations, which will become soon familiar to the student by thus practically working out the specimen.

(To be continued.)

OCCASIONAL NOTES.

THE WHITE-BEAKED DOLPHIN.—On reference to the MS. of my note on this subject (p. 103), intended to correct an error of date in a previous communication by Mr. J. M. Campbell (p. 42), I think you will find that I wrote "the Yarmouth specimen was landed on the 25th August, 1879, not 1878 as stated in 'The Zoologist' for 1881, p. 42." By an unfortunate printer's error I am made to say (p. 103), "the Yarmouth specimen was landed on the 25th August, 1878, not 1876, as stated," &c. This is to be regretted, as making confusion worse confounded. Let me repeat, therefore, as briefly as may be, that the Yarmouth specimen was landed on the 25th August, 1879.—T. SOUTHWELL (Norwich).

RED-CRESTED DUCK IN CO. KERRY.—A specimen of the Red-crested Whistling Duck (*Fuligula rufina*), was shot at Tralee by a local fowler on January 20th, 1881. I saw it skinned by Rohu, the Cork naturalist, and have the trachea, which exactly corresponds with "Yarrell's" engraving. You will note that Thompson, in his admirable work on the 'Natural History of Ireland,' states that he never heard of a specimen of this duck being obtained in Ireland; and till now I do not think it has ever been noted as a visitant to this country.—R. PAYNE GALLWEY (Cork).

[The bird, which was exhibited by Mr. A. G. More at a meeting of the Zoological Society on March 15th, is undoubtedly a male *Fuligula rufina*, concerning which Mr. R. J. Ussher has been good enough to send us some further particulars in the shape of a letter from the person who killed it, Mr. Victor M'Cowen, of Tralee. He reports that he shot it on the 18th January, not the 20th, as above reported, early in the morning; that it was quite alone, and rose from a spring in a marshy field about a quarter of a mile from the town. The occurrence of this species as an occasional wanderer to the British Islands has been noticed on some sixteen different occasions in various parts of England since 1818, when it was first recorded as having been killed in Breydon Harbour, Norfolk. Only once has it been procured in Scotland, as reported by Mr. Gray in his 'Birds of the West of Scotland,' and, until the occurrence of the example now before us, had not been met with in Ireland. Its occurrence so far westward as Tralee is remarkable, seeing that the bird is a native of South-Eastern Europe, North Africa, and Asia. In some parts of India it is particularly common. Mr. Lockwood, if we remember rightly, in his 'Natural History and Sport in India,' gives a graphic description of the appearance of a flock of several hundreds of these birds as viewed at close quarters from a boat on an unfrequented reedy lake. When it is stated that the bill, eyes, and feet are bright red, the head chestnut, breast black, and flanks white, it may be imagined how attractive must be the appearance of a flock when seen in undisturbed enjoyment of their natural haunts.—Ed.]

Wildfowl in Leadenhall Market. — Thinking that the Arctic weather of January would probably bring some rare birds to Leadenhall Market, I took the opportunity while in London to pay several visits to that emporium of wildfowl; nor was I altogether disappointed, for I counted sixteen kinds of Wild Ducks, and an unusual number of Geese, of six species. Two, the White-fronted and the Bean, were particularly numerous. The White-fronted is always common, but I have, in a previous winter, found the Bean very scarce, and almost impossible to get. On January 26th a curious variety of the immature White-fronted Goose was hanging up. In this species the under surface is white or greyish without any bars, in its first winter, but when adult it is crossed with deep black bars. In my bird it is neither one thing nor the other, the whole of the under surface being grey, profusely, but regularly, mottled with spots of very dark brown, showing no tendency to bars. There is a good deal of white round the base of the beak, which, together with the legs, is the usual yellow colour. The nail of the beak is half black, half white, but this is nothing unusual in this species. On the 1st of February there was a curious under-sized Sheldrake, dwarfed, it may have been, by some early wound; but it certainly was not more than half as big as some of the grand old males I saw hanging up a few days afterwards. About this time there were a great many Goosanders and Smews, many of them splendid old males, but very few Mergansers. I do not think all these Smews were of Dutch origin, as I heard of a good many being killed in England. On February 3rd a Blue Thrush (*Petrocincla cyanea*), turned up; it was a male, and is now in the possession of Mr. Brazener, of Brighton. On the 16th I spied out, among the Capercaillies, a male hybrid between this species and the Black Grouse. It was smaller than a Capercaillie, had a black beak, plum-coloured breast, and a tail which in shape was intermediate between the males of the two species.—J. H. Gurney, Jun. (Northrepps, Norwich).

Wildfowl in Co. Waterford.—During the frost of January, and up to the end of that month, numerous flocks of the White-fronted Goose (*Anser albifrons*) frequented this part of the country, both near the coast and inland, settling in the open fields. One that passed into my hands measured 28½ inches from tip of bill to tip of tail, and weighed 5¼ lbs. Another, as stated to me, measured 29¾ inches from bill to tail. The following birds have also been obtained in this neighbourhood:—A Goosander (eight seen), Shovellers, Tufted Ducks, Sheldrake, Pochards, Great Crested Grebe (immature). Sheldrakes breed in Dungarvon Bay, and Pochards are not uncommon, but the other birds are rarities here.—Richard J. Ussher (Cappagh, Cappoquin).

Rreeding range of the Snow Bunting.—After reading Professor Newton's and Mr. Cordeaux's comments (pp. 103, 104) on my note on the nesting of the Snow Bunting, I cannot doubt that I mistook the Snow Finch for the Snow Bunting. I am perfectly well acquainted with the Snow Bunting, having not only shot them in hard winters on this coast, but having had abundant opportunity of observing both sexes in confinement. Assuming, however, that there is a general resemblance between this species and *Montifringilla nivalis*, as Mr. Cordeaux says, and sufficiently so to invite comparison between the bill and hind claws, I have no doubt I mistook a species tolerably familiar to me for another, the existence of which I did not even know of. One of the birds that I saw appeared very much whiter than the other, and this I took to be the male.—W. Oxenden Hammond (St. Alban's Court, near Wingham).

Sabine's Snipe in Hampshire.—So many specimens of the so-called Sabine's Snipe have been procured of late years that it has ceased to be the rarity it was at one time supposed to be. Moreover, it is now generally regarded by ornithologists as merely a dark variety, tending towards melanism, of the Common Snipe. I have lately seen a specimen which was shot on the last day of July, 1880, by the Hon. W. Palmer, a son of Lord Selborne, at Wolmer Pond, Hants. This was a young bird, and less dark than usual in its coloration.—J. E. Harting.

An albino White-tailed Eagle.—I have procured a specimen of the White-tailed Eagle (*Haliaëtus albicilla*), in accidental or albino plumage, bluish white, similar to the Herring Gull. A pair of them were seen, and this one shot. I sent it to the naturalist for the Edinburgh Museum for preservation, and it is now in my possession. While in Edinburgh it was exhibited at a meeting of the Royal Physical Society on the 9th November, and a note was sent me to the effect that only one other bird in this plumage is in Scotland. This is in the Dunrobin Museum, and was shot in Sutherland.—J. T. Garriock (Prospect House, Lerwick).

Eider Duck in Sussex.—Referring to Mr. Langton's note in 'The Zoologist' for February (page 63), I may state that three specimens of the Eider Duck, killed on the Sussex coast since the publication of 'Ornithological Rambles,' have come under my notice. One in my own collection was obtained at Selsey in December, 1858. On December 18th, 1867, I saw one which had just been killed at Wittering. The third was killed by a Bosham gunner in the harbour on December 11th, 1872: he called it a "black duck," which is a name usually applied in this part to the Scoters.—William Jeffery (Ratham, Chichester).

Appearance of the Blackcap in March.—On the morning of March 8th I saw a female Blackcap Warbler in my garden at Weston, Herts. As I was able to get within three paces of her, and the light was good, I identified her with certainty. This early appearance, after such severe weather is exceptionally difficult to account for.—M. R. Pryor (Weston Manor, Stevenage).

Shore Lark near Scarborough.—On January 15th I shot a male specimen of the Shore Lark (*Alauda alpestris*), about a mile to the north of Scarborough. It is in almost mature plumage, having the black on the head interspersed with a few brown feathers. It was in company with two other Larks, but I could not be sure if they were of the same species.—R. P. Harper (2, Royal Crescent, Scarborough).

Occurrence of the Desert Wheatear in Scotland.—From a paper by Mr. J. J. Dalgleish, read before the Royal Physical Society of Edinburgh on the 19th January last (Proc. Roy. Phys. Soc. Edin., vol. vi., p. 64), it appears that a specimen of the Desert Wheatear (*Saxicola deserti*, Rüppell), was killed on the 26th November, 1880, near Alloa, in Clackmannanshire. The specimen having been forwarded to Mr. Dalgleish, he compared it with skins from Egypt and India, and satisfied himself as to the identity of the species. This is the second addition to the *Saxicolæ* on the British list within a recent period, a specimen of the Russet Wheatear (*S. rufa*, Brisson), having been obtained for the first time in England at Bury, Lancashire, on the 8th May, 1875, as recorded in the Proc. Zool. Soc., 1878, pp. 881, 977.—J. E. Harting.

Errata.—Page 48, line 12, for "Hoopoe," read "Hooper." Page 103, line 29, for "stems," read "stones."

Does the Flying-fish Fly?—From my own observations on species of *Exocœtus*, made during a voyage to the Cape of Good Hope in 1860, and on the return voyage to England in the following year, I should answer this question in the negative. Having read Mr. Whitman's statements in 'The Zoologist' for November last, and the observations of Mr. Moseley and Capt. Hadfield in subsequent numbers, I was induced to refer to the notes I made after frequent careful observations. The conclusion I arrived at was that the Flying-fish has no real power of flight, nor can it guide its course when in the air. Those I saw invariably rose from the sea *against* the wind, generally skimming low over the water for about fifty yards, when they plunged head-foremost into it. Sometimes, however, their aërial course was more prolonged, perhaps from one to two hundred yards. They were carried forward with great velocity by the initial spring they made from the water, but frequently the wind would drive them round, and if the vessel happened to be in the way they came on board. I repeatedly saw them bend their bodies till the lower lobes of their caudal fins touched the water, by which means they were enabled to renew their course through the air, and to change its direction. They did not rise so much, nor go so far in the air at a stretch, in calm weather as they did in rough. Although I often noticed a quivering motion of the pectoral fins, I did not observe any regular flapping strokes in the air, such as a bat or bird gives with its wings. A shoal of Flying-fish rising from the sea always reminded me of a flock of Sandpipers or small Plovers, their white bellies flashing in the sunshine, and it is difficult for a casual observer to realise that these fishes are not really flying. If, however, they are carefully watched, it will soon be apparent that the long pectoral fins act merely as a parachute or kite does. It is not often that one is close enough to see the fish when actually leaving the water, but my impression is that the initial impetus is given by the action of the caudal fin and the hinder portion of the body.—W. S. M. D'Urban (Albert Memorial Museum, Exeter).

The Flying-fish.—It is remarkable that there should still be any doubt as to the facts in connection with the flight of the Flying-fish. Dr. Günther ('Study of Fishes,' p. 622), summarising the observation of Möbius, says that "they frequently overtop each wave, being carried over it by the pressure of the disturbed air" (in the open sea!). Again, Flying-fishes "never" fall on board vessels "during a calm or from the lee side." At night, "when they are unable to see, they frequently fly against the weather-board, when they are caught by the current of air and carried upwards to a height of twenty feet above the surface of the water." Surely the fish going at the rate of at least ten miles an hour would, on striking the "weather-board," be dashed, bruised and helpless, back into the water instead of coming over the side fresh and vigorous, flapping about on the deck. Except when "by a stroke of its tail" it turns towards the right or left, Möbius concludes that "any deflection from a straight course is due to external circumstances, and not to voluntary action on the part of the fish." I have watched Flying-fish repeatedly, and have invariably seen them fly, or rather glide, over the surface of the sea, and from one to two feet above it, rising gently to the swell when there was no wind, and occasionally turning to the right or left without touching the water. I do not say that when there is a breeze the tail of the fish may not touch it, but I think that, with the foam and spray of the broken water, it would be very difficult to be sure of it, and, moreover, if the tail was used the motion would be a jerking one. Mr. Wallace speaks of their "rising and falling in the most graceful manner," which, although he is referring to another species, applies also to the North Atlantic form (*Exocœtus evolans*). Mr. Bennett ('Gatherings,' &c., p. 14), says that they "spring from the sea to a great elevation." This is probably in reference to their coming on board ship at night, attracted, it is supposed, by the lights. I believe the pectoral fins are kept extended without any motion, except perhaps as Mr Whitman, a recent observer, says, just when they rise from the sea. He gives 800 to 1200 feet as the greatest distance he has seen them fly, and about forty seconds as the longest time out of the water. By what mechanical means they move when out of the water is still to me a mystery. I have never known the Flying-fish to be pursued by other fish, nor ever seen any bird near them; indeed few birds are ever seen far from the land north of the southern tropic, where Flying-fish are most abundant. The Dolphin (*Coryphæna*) is supposed to be their greatest enemy. I had once an opportunity of seeing one opened—in the West Indies; its stomach was quite full of *Orthagoriscus mola*, very young, being not quite an inch long.—Francis P. Pascoe (1, Burlington Road, W.)—'*Nature*,' Feb. 3.

MEMOIR OF THE LATE EDWARD R. ALSTON, F.L.S.

In London, on March 7th, of acute phthisis, died Edward Richard Alston, of Stockbriggs, Lesmahagow, Lanarkshire, at the comparatively early age of thirty-five. To say that his death has called forth a universal expression of regret amongst those who knew him is only to announce the feeling of a host of friends; a feeling which, we doubt not, will be shared by very many readers of this Journal to whom his name will be familiar, even if they could not claim a personal acquaintance with him.

Like many another naturalist who has preceded him, and who has made his mark upon the age, Edward Alston's earliest publications appeared in the pages of 'The Zoologist,' to which periodical for some years he was a frequent contributor. Amongst the articles which will be fresh in the recollection of our readers may be mentioned his "Notes on the Quadrupeds and Birds of Lanarkshire" (Zool. 1865, '66, '67), "On the Wild Cattle of Cadzow" (Id. 1865), "Zoological Notes from Arran" (Id. 1866), "On the Habits of the Roe-deer (Id. 1867), "The Folk-lore of Zoology" (Id. 1867-8), "Wayside Notes in France and Germany" (Id. 1868), and "Observations on British Martens" (Id. 1879).

After a year or two spent in travel, during which time, in company with his friend Mr. Harvie Brown, he visited Norway, and Archangel, exploring the country lying at the mouth of the Dwina, of which they gave a most interesting account in 'The

Ibis' for 1873, he settled down in London, and devoted his leisure hours to Zoology, attending the lectures at the Royal College of Surgeons, and visiting the Prosector's studio at the Zoological Society's Gardens, where, with the assistance of the late Prof. Garrod, and of his successor Mr. W. A. Forbes, he made much progress in the study of comparative anatomy.

It was about this time (1873) that he began to work earnestly at a study of the Mammalia, combining research into the literature of the subject with an examination not merely of the external form of museum specimens, but of the osteology and internal structure whenever opportunity presented itself. In this year he undertook the difficult duty of recorder for 'The Zoological Record' of the class *Mammalia*, a duty which he discharged with efficiency until the close of the year 1878, when he was succeeded by Mr. W. A. Forbes.

Elected a Fellow of the Zoological Society in 1869, his first contribution to the 'Proceedings' of that Society appeared in 1874, in the shape of remarks "On a new species of *Pteropus* from Samoa;" and in the same year, in conjunction with Dr. H. Blackmore, he communicated a valuable paper on Fossil *Arvicolidæ*. These were succeeded by the following:—"On *Anomalurus*, its structure and position" (Proc. Zool. Soc. 1875); "On the Murine Dormouse, *Graphiurus murinus*" (1875); "On the classification of the Order *Glires*" (1876); "On the genus *Dasyprocta*" (1876); "On two new species of *Hesperomys*" (1876); "On the Rodents and Marsupials of Duke of York Island and New Britain" (1877); "On an undescribed Shrew from Central America" (1877); "On the Mammals of Asia Minor" (1877); "On the Dentition of *Cuscus*" (1878); "On *Synaptomys Cooperi*" (1878); "On the Squirrels of the Neotropical Region" (1878); "On female Deer with Antlers" (1879); "On the specific identity of the British Martens" (1879); "On *Acanthomys leucopus* of Gray" (1879); "On Burmese and Afghan Mammals" (1879); "On a skull of *Tapirus dowi*" (1879); "On a four-horned Chamois" (1879); "On *Tapirus dowi* and *Antechinomys lanigera*" (1880); "On *Antechinomys* and its allies" (1880).

Of his contributions to Scottish periodicals we have no complete list, but we cannot pass unnoticed his 'Catalogue of the Mammals and Reptiles of Sutherlandshire,' revised and issued in pamphlet form in 1875, and his 'Catalogue of Scottish Mammals,' undertaken at the request of the Natural History Society of Glasgow for a projected "Fauna of Scotland," and published in January, 1880.

Side by side with these productions other excellent work was in progress. In 1874 appeared the second edition of Bell's 'British Quadrupeds,' a considerable portion of which was revised by Mr. Alston, whose name appears as coadjutor on the title-page; and in 1879 he commenced his account of the Mammals of Mexico and Central America for Messrs. Godman and Salvin's 'Biologia Centrali Americana,' which, fortunately for zoologists, he had just completed at the time of his death. This valuable contribution to science, extending over 200 quarto pages, may be regarded as his most important work—a work which, if he had published nothing else, would alone have entitled him to a place in the front rank of scientific naturalists.

But it is not only as a loss to zoological science that the untimely death of Edward Alston will be regretted; he will be remembered by those who knew him best for his generous open-hearted disposition, his honest straightforward character, and his private worth as a friend.

At the time of his death he held the post of Zoological Secretary to the Linnean Society, of which learned body he was elected a Fellow in 1876.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Linnean Society of London.

February 3, 1881.—Robert M'Lachlan, Esq., F.R.S., in the chair.

Lieut.-Col. A. A. Davidson (Madras) was elected a Fellow.

Dried specimens of a Worm and of a Fresh-water Mussel, in which the soft tissues were preserved intact by a new method adopted by Prof. C. Semper, were exhibited on behalf of Herr L. Würth, of Wurzburg.

Mr. A. D. Michael read a communication, "Observations on the Life-History of *Gamasinæ*." In this the author endeavoured to decide some of the disputed and knotty points in reference to these humble parasites, M. Megnin, of Versailles, and Dr. Kramer, of Schleusingen, both good authorities on the subject, being at variance thereon. Mr. Michael, believing that detached observations on captured specimens may have produced unreliable results, has himself bred Gamasids, closely followed their changes and growth, and watched their manners, and thus has arrived at what, on good grounds, he assumes to be important results respecting their life-history. He states that the remarkable power of darting each mandible separately with speed and accuracy of aim far in advance of the body, the powerful retractile muscles attached to these mandibles, the organization of the remainder of the mouth, the extreme swiftness of the creatures, the use of the front legs as tactile organs only, and not for the purposes of locomotion, and the ample supply of tactile hairs in front only, seem to fit the animals for a predatory life, and point to habits similar to those of *Cheyletus* and *Trombidium*, rather than to those of the true vegetable feeders, such as the *Oribatidæ* and *Tetramachi*. He further concludes:—(1) That Megnin is correct in saying *Gamasus coleoptratorum*, and other allied creatures, with the conspicuously divided dorsal plates, are not species at all, but immature stages of other species. (2) That the division of the dorsal plate is, in most cases at all events, a question of degree, and does not form a sound basis for classification, as applied by Koch, Kramer, and others. (3) That the dorsal plates do not grow gradually, but alter in size, shape, or development at the ecdysis. (4) That Megnin is right in saying that the characteristic of the so-called *G. marginatus* is simply a provision possessed by the females of a large number of species. (5) That the extent of the white margin depends upon the extent to which the abdomen is distended by eggs. (6) That Megnin is in error in saying that *coleoptratorum* is the nymph of *crassipes*. The nymph of *crassipes* does not show any divided dorsal plates which can be seen on the living creature. (7) That in the species which I have bred there is not any inert stage before the transformation or ecdysis. (8) That in the same species it is the adult female, and not the immature one, as Megnin contends, which breeds.

February 17, 1881.—Frank Crisp, Esq., LL.B., F.L.S., in the chair.

Mr. A. Hammond exhibited a specimen under the microscope, along with a drawing of a portion of the wall, of the so called glandular sac of the larva of the Puss Moth, *Cerura vinula*, from which that insect is said to eject an acid liquid when alarmed or irritated. He stated that although there could be no doubt that the organ was the source of the excretion in question, there nevertheless was some difficulty in regarding it as a true glandular structure from the large quantity of chitinous matter constituting the wall of the sac itself.

Dr. Francis Day read a paper "Observations on some British Fishes." He pointed out that *Pimelepterus cornubiensis*, Cornish, is identical with the American *Pammelas perciformis*, Mitchell; that great confusion exists in the works of Yarrell and Couch respecting the Tunnies and their allies, most if not all the examples of the Short-finned Tunnies being in reality specimens of *Pelamys sarda;* that the Comber Wrasse (*Labrus Donovani*, Cuv. & Val.) is a peculiarly coloured variety of *L. maculatus*, Bloch; that *Crenilabrus Baillonii*, Couch, is *C. melops*, Cuv. & Val. Adult examples of Brill and Sole were exhibited, coloured on both sides, but in which the eyes were normal. Some Sprats were adverted to which had fully-developed ova in January this year, having been obtained off St. Ives. Dr. Day adduced evidence that the specimen of *Ostracion quadricornis* figured by Couch, had not been captured on the British coast near Mevagissey, as reported, but had been brought in salt by a sailor from a warmer climate. Some observations were also made by the author on the habits of the Thresher Shark in relation to Whales.

Prof. P. Martin Duncan read a paper on some Sponges obtained among a mass of fistulose Coral from deep water (1095 fathoms) off the south coast of Spain, during the dredging expedition of H.M.S. 'Porcupine.' One of the Sponges, apparently characteristically new, is described as a species of *Leiodermatium*, *L. affine*, and another belongs to the genus *Aphrocallistes*.—J. Murie.

Zoological Society of London.

February 1, 1880.—Prof. Flower, LL.D., F.R.S., President, in the chair.

Mr. F. M. Balfour read a paper on the evolution of the placenta, and made some observations on the possibility of employing the characters of this organ in the classification of the Mammals.

Mr. Sclater read notes on some Birds collected by Mr. E. F. im-Thurn in British Guiana, amongst which was an example of a new species of *Agelæus*, proposed to be called *A. im-Thurni*, after its discoverer.

Mr. W. T. Blanford read an account of a collection of Reptiles and Frogs made at Singapore by Dr. W. B. Dennys. In this collection were two new species of Ophidians, which were named respectively *Cylindrophis lineatus* and *Simotes Dennysi*, and two new Frogs, which the author proposed to call *Rana laticeps* and *Rhacophorus Dennysi*.

Mr. A. D. Bartlett read an account of a peculiar habit of the Darter, *Plotus anhinga*, in casting up parts of the epithelial lining of the stomach, as observed by him in the specimen now living in the Society's collection.

A communication was read from Mr. A. Heneage Cocks, containing notes on the breeding of Otters, as observed by him in specimens living in his possession.

The Secretary read a paper by the late Mr. Arthur O'Shaughnessy, containing an account of a large collection of Lizards made by Mr. C. Buckley in Ecuador. The collection was stated to be of great interest, both on account of the number of new species it contained and the fresh material it afforded for the study of species already known. Mr. O'Shaughnessy had given last year a partial notice of this collection, confined, however, to a preliminary list of the species of *Anolis* identified. The present paper gave the results of a study of the whole collection, and was not restricted to the description of the new forms, but enumerated all the species, for the purpose of recording additional remarks and revisions which appeared necessary. In it twenty-seven species were mentioned, ten of which were new.

Mr. G. A. Boulenger read an account of a new species of *Enyalius* in the Brussels Museum, from Ecuador, which he proposed to name *Enyalius O'Shaughnessyi.*

Lieut.-Col. H. H. Godwin-Austen read the first part of a memoir on the Land Shells collected on the island of Socotra by Prof. I. B. Balfour. The present communication comprised an account of the species of *Cyclostomacea* found on the island.

February 15, 1881.—Prof W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of January, 1881, and called special attention to a White-nosed Saki, *Pithesia albinasa*, purchased Jan. 11th; an American Monkey of the genus *Callithrix* (probably referable to *C. brunnea*), purchased along with the preceding; and an example of an Insectivore of the genus *Tupaia* (probably *T. tana*), obtained by purchase on the same day.

Mr. Sclater exhibited and made remarks on some eggs of *Opisthocomus cristatus*, obtained at Obydos on the Amazons.

Mr. Howard Saunders, on behalf of Capt. E. A. Butler, exhibited and made remarks on specimens of the eggs of *Dromas ardeola*.

The Rev. O. P. Cambridge exhibited and made remarks on an Hymenopterous parasite, bred from larvæ found on two Spiders—*Linyphia obscura*, Blackw. (female), and *L. zebrina*, Menge (male). The larvæ were stated to be apodous, and to adhere to the abdomen of the Spider, which, when full grown, they fully equalled in size.

Mr. E. W. H. Holdsworth exhibited a specimen of White's Thrush, *Turdus varius*, killed in South Devonshire in January last.

Mr. C. O. Waterhouse read a paper on the Coleopterous Insects belonging to the family *Hispidæ*, collected by Mr. Buckley in Ecuador. Seventeen species of *Hispidæ* had hitherto been recorded as inhabiting that country; of these Mr. Buckley had met with fifteen, which, together with nineteen new species, made a total of thirty-six species in the series now described.

Mr. W. L. Distant read a paper on some additions which had been lately made to the Rhynchotal Fauna of the Ethiopian Region, nine new species belonging to the families *Pentatomidæ*, *Coreidæ* and *Pyrrhocoridæ* were pointed out, and in the *Coreidæ* two new genera, allied to *Petillia* and

Petascelis, were described. The specimens had been obtained from Western, Southern, and Eastern Africa.

A communication was read from Mr. Edgar A. Smith on some shells from Lakes Tanganyika and Nyassa, and from other localities in East Africa, lately received by the British Museum. Great interest attached to some of the shells from Lake Tanganyika, from the fact that they had all the appearance of being modified marine types.

Lord Walsingham read a paper on some new and little-known species of North American *Tineidæ*, amongst which were three new generic forms.—P. L. Sclater, *Secretary*.

Entomological Society of London.

February 2, 1881.—H. T. Stainton, Esq., F.R.S., &c., President, in the chair.

The President made some prefatory remarks, thanking the Society for electing him to that office. He nominated Sir John Lubbock, Bart., Mr. R. Meldola, and Mr. W. L. Distant as Vice-Presidents for the ensuing year.

Mr. Alfred Lloyd, F.C.S. (Dome House, Upper Bognor), and Mr. Theodore Wood (5, Selwyn Terrace, Jasper Road, Upper Norwood), were balloted for and elected Ordinary Members of the Society.

Mr. O. Salvin exhibited two large boxes of Insects of all Orders, collected on the Altos and Pacific coast of Guatemala by Mr. Champion. These had but just arrived, and had not yet been critically examined.

Mr. W. A. Forbes exhibited a curious filamentous growth upon a leaf from New Britain, due to the presence of one of the *Coccidæ;* also the larva of one of the *Blattidæ* from Pernambuco, North Brazil, which was remarkable for its superficial resemblance to an Isopod crustacean. These larvæ were common under the bark of trees in damp woods.

Mr. R. M'Lachlan exhibited two examples of the fungoid parasites of insects. Firstly, a *Sphæria* (*Cordyceps*) attacking a larva from South America, said to be the destructive cotton worm. The larvæ exhibited were certainly coleopterous, and Mr. M'Lachlan considered it probable they belonged to the genus *Dynastes*. Secondly, a moth, one of the *Noctuæ*, from South Wales, attacked by a species of *Isaria*.

Mr. C. O. Waterhouse was inclined to refer the South American larva to the genus *Passalus*, from an examination of the form of the head.

Mr. M'Lachlan also exhibited three males and one female of *Thore concinna*, a beautiful dragon-fly from Ecuador described in his paper read this evening.

Mr. T. R. Billups exhibited two specimens of *Pezomăchus distinctus*, a species new to the British fauna, from Mickleham; also a new species of *Stibeutes*, captured at Deal last August.

Mr. F. P. Pascoe exhibited a specimen of *Peripatus Novæ-Zelandiæ* in spirits, and remarked that Sir J. Lubbock, in his recent Address, quoted a German author who asserted that the tracheæ discovered by Moseley were merely modifications of the subcutaneous glands, thus again removing this curious creature from the *Arthropoda* back to the worms (*Vermes*). This was, however, contrary to the opinion of Huxley, Schmarda and other writers. It was stated that *Peripatus* was unsegmented, but Schmarda gives "13 to 36" segments in characterizing the group. Through the kindness of Prof. Jeffrey Bell, he (Mr. Pascoe) had examined the species in the British Museum, and found that *P. Edwardsii* was the only one with any traces of segmentation. It is probable that Schmarda intended that each pair of legs indicated a segment.

Mr. W. L. Distant exhibited a very large *Cicada* received from Madagascar, belonging to the genus *Platypleura*, but at present undescribed.

In reply to the President, as to whether any information was procured as to the amount of sound produced by the musical apparatus of this large *Cicada*, Mr. Distant stated that unfortunately he had no opportunity of learning anything of its habits; but that he might perhaps be permitted to state, whilst on the subject, that though undoubtedly the possession of the sound-giving apparatus was confined to the males, and was thus due to sexual causes and used for sexual purposes, it might still possibly serve some protective function as well.

Mr. W. F. Kirby announced the death of Herr Gabriel Koch, sen., of Frankfurt, on January 22nd, 1881, in the seventy-fourth year of his age. He was best known for his work on the geographical distribution of Lepidoptera.

Mr. R. Meldola read a communication from M. André with reference to some criticisms, made at the October meeting of the Society, on the author's method of publishing the descriptions of new genera and species on the wrapper or on loose sheets of his work now publishing on the Hymenoptera of Europe.

The Secretary read a letter from Mr. George Giles, of Brixton, enclosing a newspaper cutting from an Australian paper detailing the death of a child, in consequence, as was supposed, of the bite of a small spider.

Mr. Arthur G. Butler communicated a paper entitled "Descriptions of new Genera and Species of Heterocerous Lepidoptera from Japan."

Mr. R. M'Lachlan read some "Notes on *Odonata* of the Subfamilies *Corduliina*, *Calopterygina*, and *Agrionina* (Legion *Pseudostigma*), collected by Mr. Buckley in the district of the Rio Bobonaza in Ecuador."

Mr. W. F. Kirby read "A List of the Hymenoptera of New Zealand," in which eighty-two species were enumerated, including five described as new.

Mr. Joseph S. Baly communicated a paper entitled "Descriptions of new species of *Galerucidæ*."—E. A. Fitch, *Hon. Secretary*.

NOTICES OF NEW BOOKS.

A List of European Birds, including all Species found in the Western Palæarctic Region. The Nomenclature carefully revised by HENRY E. DRESSER, F.L.S., F.Z.S., &c. 8vo, pp. 40. London: published by the Author at 6, Tenterden Street, Hanover Square. 1881.

WE rejoice to see that Mr. Dresser has completed his labours in writing a 'History of the Birds of Europe' by publishing a convenient list of the species described and figured in that work. Regarding the form in which the list is presented, it is impossible for the critic to be otherwise than complimentary; the pamphlet is of a handy size, and the typography and paper are alike excellent. The plan of leaving the right half of each page blank makes the list equally available for labels and for notes.

The first thing that will strike the majority of readers will no doubt be the novelty of the systematic arrangement. When such a step in scientific advancement as Mr. Dresser has here made is taken in a popular work, it behoves a reviewer to ignore captious criticism, and to devote his alloted space to help in making clear the reasons for such a radical innovation.

Now it is unfortunate that Mr. Dresser states in his Introduction that he has followed Professor Huxley's classification; he has indeed followed his principles, but we doubt whether Professor Huxley would, without this remark, have been at once struck with their paternity. The history of the matter is somewhat in this wise. In April, 1867, Prof. Huxley read a paper before the Zoological Society of London "On the Classification of Birds; and on the Taxonomic Value of the Modifications of certain of the Cranial Bones observable in that Class." Some of his conclusions were modified subsequently (P. Z. S., May 14, 1868), and Prof. Parker has suggested further modifications which more extended research has shown to be necessary; but the main points of the revolution he inaugurated remain to this day unimpugned. Ornithologists—at least those who are mainly concerned in observing the phases of bird-life, apart from comparative zoological considerations—have been slow to take in the value of Prof. Huxley's conclusions, and Messrs. Sclater and Salvin seem to be the only authors who have given them the benefit of a practical application. In their 'Nomenclator Avium Neotropicalium' a modification of the new classification is adopted, which Mr. Sclater has done much to popularise in each successive edition of the 'List of Vertebrates now or lately living in the Gardens of the Zoological Society of London.' But it is to be noticed that the new nomenclature proposed by Prof. Huxley is, by all his followers, rejected. It is found more convenient in practice to use the name *Passeres* than, out of simple regard for uniformity, *Coracomorphæ;* the name *Columbæ* has a familiar ring that its Huxleyan equivalent *Peristeromorphæ* can never reach; and the credit of giving popular currency and scientific limitation to old names is due, not to Prof. Huxley, but to Mr. Sclater. One obvious advantage of the new method is that, in place of the old six or seven unwieldy "orders" of European birds, we have, in Mr. Dresser's List, no less than sixteen orders, and the familiar names go far to simplify the comprehension of the new system. Anatomists seem pretty well agreed that Prof. Huxley's classification of birds is the best that has yet been proposed, but ornithologists who follow him ought, in common fairness, to be careful to acknowledge that it is his principles rather than his practice that they adopt.

Now Prof. Huxley subdivides all species of birds that exist at the present day into (1) those that have a keeled sternum, which gives attachment to the muscles that act upon the wings, and (2) those that have no keel developed on the sternum at all; the one group he calls *Carinatæ* (from *carina*, a keel), the other *Ratitæ* (from *ratis*, a raft). This he does on the principles of the theory of Evolution, taking for granted that all birds had a common ancestor; that some groups had no necessity for the use of wings, therefore muscles to move them became, in course of time, an impediment rather than an assistance; while others could only support existence by emphasising the faculty of flight. In Europe we are only concerned with the *Carinatæ*. These Prof. Huxley divides according to peculiarities in the construction of their skulls; and he takes such a point because it can only be in the most remote degree referable to the individual bird's manner of life; it is not a character which can ever have had its origin in external circumstances; it must have arisen from genetic divergences. He finds that one group of birds has the maxillo-palatine bones united (*Desmognathæ*); in the other groups—and by this means he gets another perfect dichotomy, a positive class and a negative class—the maxillo-palatines are free and separate. But, unfortunately for systematists, this latter class contains by far the greater number of species, so that a further subdivision becomes necessary. The formation of the vomer, or ploughshare-bone of the palate, affords here definite characteristics; one group has the vomer pointed in front (*Schizognathæ*), the other has it truncated, or cut off nearly square (*Ægithognathæ*).

All this while we must bear in mind that the whole classification is, or aims at being, simply the formation of a family-tree. We do not know what the primitive bird was, but we regard it as the trunk of the tree. After a time the birds which used wings diverged from those which did not; whereby we get two branches. One of these branches was stunted, but it bore strange Ostriches and Cassowaries, and such like, which do not concern us here. The other was imbued with a vigorous life. In one direction it bore *Desmognathous* birds—birds of prey, Cuckoos, Ducks, Herons, and Penguins; each grew out to bear twigs and sprays and leaves innumerable; all successively divergent, but all tracing their descent from one particular branch. In another it bore birds which so soon emphasised their peculiarities that the great boughs bearing *Schizognathous* and *Ægithognathous* birds grew so strong as to form features comparable to the whole of the *Desmognathous* ones taken together. Every fresh divergence sought air and space for fresh change, and now at the present day we must not compare adjacent leaves in the periphery of our family-tree, but must seek, through all their obvious semblance, the branch from which they severally spring. The leaves all point to different spots in the heavens, and we cannot scientifically arrange them in any linear order. One belongs to this family and another to that, and when we have to print their names in order, page after page, we must not expect the first of one group to bear any necessary relation to the last of its predecessor; it is the group, not the individual, which we must compare. Regarded in this light we no longer see any absurdity in ranging the Smew next the Ring-Dove, for example; one springs from a totally different branch from the other. And while we must congratulate Mr. Dresser on his great endeavours, we can well forgive him his peculiarities; we might easily complain of his subdivision of the *Passeres*, but we dare not, at a moment's notice (if we could after a life-long study), propose a better.

A List of British Birds, with, as an Appendix, the "Graduated List" for labelling Eggs. Compiled by HERBERT W. MARSDEN. 35 pp. Gloucester: H. W. Marsden. 1881.

IT is difficult to perceive the exact purpose which the present publication, of which the name sufficiently indicates the nature, is intended to fulfil. Of dealers' lists the name is legion. All are more or less founded on the last completed edition of Yarrell's 'History of British Birds.' Mr. Marsden has copied his predecessors in little else than their antiquated system of classification; nine times out of ten he has followed the nomenclature adopted by Mr. H. T. Wharton in his 'List of British Birds,' which was reviewed in these colums four years ago ('Zoologist,' 1877, pp. 458 *seq.*). Not that we blame him for taking one of the latest authorities for his model; but that he does so somewhat blindly is copiously illustrated by his divergences. For instance, *Haliæctus* (No. 5) can only be spelt *Haliaëtus* rightly; Prof. Newton (Yarrell, ed. 4, vol. i., p. 333) has shown that the specific name of the Black Redstart should be *titys*, not *tithys* (No. 67); "Sylvia *undatus*" (No. 81) is an amusing instance of the necessity for circumspection in changing a generic name; and *Actitis hypoleucos* (No. 245), *Tringa subarcuata* (No. 249), *Tringa temminckii*, *Xema sabini*, &c., seem very like cases of sinning against light. After Mr. Howard Saunders's exhaustive elucidation of the synonymy of the *Laridæ*, it is grievous to see *Rhodostethia rossi* (Richardson, 1825) still given (No. 384) as the name of *R. rosea* (Macgillivray, 1824); and the appellations of Richardson's and Buffon's Skuas thrown back into the confusion of incorrect nomenclature. If Mr. Marsden disagrees with recent lists, he should at least regard the conclusions of the latest monographers; when he fails to do this latter, it is perhaps not surprising that he should come to some strange results regarding the generic titles of the *Strigidæ*. Ornithologists are not unanimous, it is true, in accepting Professor Newton's interpretation of the Stricklandian Code in this matter; but he who follows him in calling the Barn Owl *Aluco flammeus* (No. 37) is scarcely justified in calling the "Sparrow Owl" *Strix passerina* (No. 34), whatever he may mean by the name.

While we cannot but disagree with Mr. Marsden on such points as these, we must commend his intention of marking each species not truly British with an indication of its national home. Now that observers are so numerous, it is important that species accredited to the British Fauna should not permanently take their place there without a *caveat* respecting their alien origin. However, Mr. Marsden's additions to the list of birds generally reputed British seem rather arbitrarily chosen. For example, the Red-eyed Flycatcher's occurrence in Britain rests on very different evidence than does that of the Russet Wheatear or the Barred Warbler; there seems to be no presumption of the former having been found wild in Europe. And as to the Rufous Swallow, Mr. Dresser has shown, in part 37 of his 'Birds of Europe,' that the record of its having appeared in Britain is due to a mistake in identification; yet, if it be admitted, it should be called *Hirundo savignii* of Stephens, 1817, not, as Mr. Marsden has it (No. 189), *Hirundo cahirica* of Lichtenstein, 1823.

Whether a new List of British Birds was wanted at all just now, when it is known that the British Ornithologists' Union has appointed a Committee to draw up one that, it may be presumed, will carry considerable authority, is perhaps merely a question of trade convenience; but it can hardly be gainsaid that a "Graduated List" such as Mr. Marsden furnishes us with on the last ten pages of his pamphlet cannot have any "raison d'être" whatever. It is professedly compiled for use in labelling eggs; but nowadays no egg-collector is content with anything short of actual writing on any specimens for whose identity he wishes to vouch. To gum a label on to an egg is to expose the specimen to serious disadvantages; the gum may be inefficient, and the label may consequently be lost; while, if the label do adhere, and it be at any time expedient to remove it, the chances are considerable that the label will remove a portion of the egg-shell along with it.

As a mercantile speculation, Mr. Marsden's List may meet with success; but it is rather hard that inexperienced ornithologists should be imbued by it with incorrect notions both of science and of practice.